

ABSTRACT

A laser ablation system includes a first embodiment of a nozzle assembly where a laser beam is emitted through the nozzle assembly to remove materials on a target. The nozzle assembly includes a nozzle having a top end, and a window placed on the top end of the nozzle. The window includes one or more apertures and the laser beam is emitted through one of those apertures.

Another laser ablation system includes a second embodiment of a nozzle assembly where a laser beam is emitted through the nozzle assembly to remove materials on a target. The nozzle assembly includes a nozzle having one or more channels at a top end of the nozzle. The nozzle assembly also includes a window that is placed on the one or more channels. A gas flows through the one or more channels and that gas flow reduces debris deposition on the window.

Yet another laser ablation system includes a third embodiment of a nozzle assembly that includes a nozzle that has a central channel aligned longitudinally through which said laser beam travels from a top end of said nozzle to a bottom end of said nozzle. In this embodiment, the central channel of the nozzle is threaded.